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**AMENDMENTS TO THE CLAIMS**  
**(including complete listing of the claims)**

1. (Currently Amended) The method of claim 28, wherein for the Mixtures of Experts algorithm the individual experts have a linear form

$$An = \sum_{i=1}^n An_i w_i \quad (1)$$

wherein  $(An)$  is an analyte of interest,  $n$  is the number of experts,  $An_i$  is the analyte predicted by Expert  $i$ ; and  $w_i$  is a parameter, and the individual experts  $An_i$  are further defined by the expression shown as Equation (2)

$$An_i = \sum_{j=1}^m a_{ij} P_j + z_i \quad (2)$$

wherein,  $An_i$  is the analyte predicted by Expert  $i$ ;  $P_j$  is one of  $m$  parameters,  $m$  is typically less than 100;  $a_{ij}$  are coefficients; and  $z_i$  is a constant; and further where the weighting value,  $w_i$ , is defined by the formula shown as Equation (3)

$$w_i = \frac{e^{d_i}}{\left[ \sum_{k=1}^n e^{d_k} \right]} \quad (3)$$

where  $e$  refers to the exponential function,  $d_i$  is one of the  $d_k$ ,  $d_i$  and  $d_k$  are parameter sets analogous to Equation 2 used to determine the weight  $w_i$ , the  $d_k$  are given by Equation 4

$$d_k = \sum_{j=1}^m \alpha_{jk} P_j + \omega_k \quad (4)$$

where  $\alpha_{jk}$  is coefficient,  $P_j$  is one of  $m$  parameters, and where  $\omega_k$  is a constant.

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2-4. (Canceled)

5. (Previously Presented) The method of claim 25, wherein the analyte is glucose.

6-14. (Canceled)

15. (Currently Amended) A monitoring system for measuring an amount or concentration of analyte present in a biological system, said system comprising, in operative combination:

a sensing device in operative contact with the analyte, wherein said sensing device obtains a raw signal from the analyte and said raw signal is specifically related to the amount or concentration of analyte; and

one or more microprocessors in operative communication with the sensing device, wherein said one or more microprocessors comprises programming to control

(i) operation of the sensing device; and

$$An = \sum_{i=1}^n An_i w_i \quad (1)$$

$$An_i = \sum_{j=1}^m \alpha_{ij} P_j + z_i \quad (2)$$

$$w_i = \frac{e^{d_i}}{\left[ \sum_{k=1}^n e^{d_k} \right]} \quad (3)$$

$$d_k = \sum_{j=1}^m \alpha_{jk} P_j + \omega_k \quad (4)$$

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(ii) providing two or more ranges of measurement values, wherein said measurement values are indicative of amounts or concentrations of analyte present in the biological system;

identifying the range in which a selected measurement value falls; and

employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range.

16-24. (Canceled)

25. (Currently Amended) A method for measuring an amount or concentration of analyte present in a biological system, said method comprising:

determining a measurement value indicative of the amount or concentration of analyte present in the biological system;

providing two or more ranges of measurement values;

identifying the range in which said determined measurement value falls;

employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range; and

generating further measurement values indicative of measuring amount or concentration of analyte present in the biological system using said algorithm.

26. (Previously Presented) The method of claim 25, wherein said determining a measurement value indicative of the amount or concentration of analyte present in the biological system comprises obtaining a raw signal specifically related to analyte amount or concentration in the biological system and correlating the raw signal with a measurement value.

27. (Previously Presented) The method of claim 25, wherein said determining is carried out using a Mixtures of Experts and said Mixtures of Experts algorithm is trained using a global training set.

28. (Previously Presented) The method of claim 25, wherein said algorithm for

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prediction of further measurement values is a Mixtures of Experts algorithm and said Mixtures of Experts algorithm is trained using data from the identified range.

29. (Previously Presented) The method of claim 25, further comprising identifying in which range one or more of the further measurement values falls, and employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range.

30. (Previously Presented) One or more microprocessors for use in an analyte monitoring system for measuring an amount of concentration of analyte present in a biological system, said one or more microprocessors comprising programming to control: providing two or more ranges of measurement values, wherein said measurement values are indicative of amounts or concentration of analyte present in the biological system; identifying the range in which a selected measurement value falls, and employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range.

31. (Previously Presented) The one or more microprocessors of claim 30, wherein a Mixtures of Experts algorithm is used to determine said selected measurement value and said Mixtures of Experts algorithm is trained using a global training set.

32. (Previously Presented) The one or more microprocessors of claim 30, wherein said algorithm for prediction of further measurement values is a Mixtures of Experts algorithm and said Mixtures of Experts algorithm is trained using data from the identified range.

33. (Previously Presented) The one or more microprocessors of claim 30, wherein said one or more microprocessors are further programmed to control operation of a sensing device that provides raw signal specifically related to analyte amount or concentration in the biological system.

34. (Previously Presented) The one or more microprocessors of claim 33, wherein

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said one or more microprocessors are further programmed to control correlating the raw signal with a measurement value indicative of analyte amount or concentration in the biological system.

35. (Currently Amended) The one or more microprocessors of claim 32, wherein for the Mixtures of Experts algorithm the individual experts have a linear form

$$An = \sum_{i=1}^n An_i w_i \quad (1)$$

wherein  $(An)$  is an analyte of interest,  $n$  is the number of experts,  $An_i$  is the analyte predicted by Expert  $i$ ; and  $w_i$  is a parameter, and the individual experts  $An_i$  are further defined by the expression shown as Equation (2)

$$An_i = \sum_{j=1}^m a_{ij} P_j + z_i \quad (2)$$

wherein,  $An_i$  is the analyte predicted by Expert  $i$ ;  $P_j$  is one of  $m$  parameters,  $m$  is typically less than 100,  $a_{ij}$  are coefficients; and  $z_i$  is a constant; and further where the weighting value,  $w_i$ , is defined by the formula shown as Equation (3)

$$w_i = \frac{e^{d_i}}{\left[ \sum_{k=1}^n e^{d_k} \right]} \quad (3)$$

where  $e$  refers to the exponential function,  $d_i$  is one of the  $d_k$ ,  $d_i$  and  $d_k$  are parameter sets analogous to Equation 2 used to determine the weight  $w_i$ , the  $d_k$  are given by Equation 4

$$d_k = \sum_{j=1}^m \alpha_{jk} P_j + \omega_k \quad (4)$$

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where  $\alpha_k$  is a coefficient,  $P_j$  is one of  $m$  parameters, and where  $\omega_k$  is a constant.

36. (Previously Presented) The one or more microprocessors of claim 30, wherein the analyte is glucose.

37. (Previously Presented) The monitoring system of claim 15, wherein a Mixture of Experts algorithm is used to determine said selected measurement value and said Mixture of Experts algorithm is trained using a global training set.

38. (Previously Presented) The monitoring system of claim 15, wherein said algorithm for prediction of further measurement values is a Mixture of Experts algorithm and said Mixture of Experts algorithm is trained using data from the identified range.

39. (Previously Presented) The monitoring system of claim 15, wherein said sensing device provides a raw signal specifically related to analyte amount or concentration in the biological system and said one or more microprocessors are further programmed to control correlating the raw signal with a measurement value indicative of analyte amount or concentration in the biological system.

40. (Currently Amended) The monitoring system of claim 15, wherein for the Mixture of Experts algorithm the individual experts have a linear form

$$An = \sum_{i=1}^n An_i w_i \quad (1)$$

wherein  $(An)$  is an analyte of interest,  $n$  is the number of experts,  $An_i$  is the analyte predicted by Expert  $i$ ; and  $w_i$  is a parameter, and the individual experts  $An_i$  are further defined by the expression shown as Equation (2)

$$An_i = \sum_{j=1}^m a_{ij} P_j + z_i \quad (2)$$

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wherein,  $An_i$  is the analyte predicted by Expert  $i$ ;  $P_j$  is one of  $m$  parameters,  $m$  is typically less than 100;  $a_{ij}$  are coefficients; and  $z_i$  is a constant; and further where the weighting value,  $w_i$ , is defined by the formula shown as Equation (3)

$$w_i = \frac{e^{d_i}}{\left[ \sum_{k=1}^n e^{d_k} \right]} \quad (3)$$

where  $e$  refers to the exponential function,  $d_i$  is one of the  $d_k$ ,  $d_i$  and  $d_k$  are parameter sets analogous to Equation 2 used to determine the weight  $w_i$ , the  $d_k$  are given by Equation 4

$$d_k = \sum_{j=1}^m \alpha_{jk} P_j + \omega_k \quad (4)$$

where  $\alpha_{jk}$  is a coefficient,  $P_j$  is one of  $m$  parameters, and where  $\omega_k$  is a constant.

41. (Previously Presented) The monitoring system of claim 15, wherein the analyte is glucose.

42. (New) The method of claim 25, wherein said generating further measurement values indicative of amount or concentration of analyte present in the biological system comprises obtaining a raw signal specifically related to analyte amount or concentration in the biological system and using said algorithm to correlate the raw signal with a measurement value.

43. (New) The method of claim 25, wherein said determining a measurement value indicative of the amount or concentration of analyte present in the biological system comprises a calibration step.

44. (New) The method of claim 43, wherein said calibration step correlates a raw

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signal obtained from a sensing device with a concentration of analyte present in the biological system.

45. (New) The method of claim 44, wherein said calibration step provides a calibrated signal by a method comprising

$$\text{signal} = \frac{BG_{cp}}{\text{active}_{cp}} (\text{active})$$

wherein, *signal* is the calibrated signal,  $BG_{cp}$  is blood glucose value at a calibration point,  $\text{active}_{cp}$  is an active signal that corresponds to an electrochemical sensor signal at the calibration point, and *active* is an active signal that corresponds to an electrochemical sensor signal.

46. (New) The method of claim 44, wherein said calibration step provides a calibrated signal by a method comprising

$$\text{signal} = \frac{BG_{cp}}{(\text{active}_{cp} + \text{offset})} (\text{active} + \text{offset})$$

wherein, *signal* is the calibrated signal,  $BG_{cp}$  is blood glucose value at a calibration point,  $\text{active}_{cp}$  is an active signal that corresponds to an electrochemical sensor signal at the calibration point, *active* is an active signal that corresponds to an electrochemical sensor signal, and *offset* is a value that takes into account a non-zero y-intercept value.

47. (New) A method of calibrating an analyte monitoring device for use in measuring analyte amount or concentration in a biological system, said method comprising determining a calibration ratio (CalRatio) value, wherein

$$\text{CalRatio} = \frac{BG_{cp}}{(\text{active}_{cp} + \text{offset})}$$

wherein  $BG_{cp}$  is a blood glucose concentration at the calibration point,  $\text{active}_{cp}$  is an active signal that corresponds to an electrochemical sensor signal at the calibration point, and *offset* was a constant value;



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providing two or more ranges of CalRatio values;  
identifying the range in which said determined CalRatio value falls;  
employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range; and  
generating further measurement values indicative of amount or concentration of analyte present in the biological system, said generating comprising obtaining a raw signal specifically related to analyte amount or concentration in the biological system and using said algorithm to correlate the raw signal with a measurement value.

48. (New) One or more microprocessors for use in an analyte monitoring system for measuring an amount or concentration of analyte present in a biological system, said one or more microprocessors comprising programming to control:

determining a calibration ratio (CalRatio) value, wherein

$$\text{CalRatio} = \frac{BG_{cp}}{(\text{active}_{cp} + \text{offset})}$$

wherein  $BG_{cp}$  is a blood glucose concentration at the calibration point,  $\text{active}_{cp}$  is an active signal that corresponds to an electrochemical sensor signal at the calibration point, and  $\text{offset}$  was a constant value;

providing two or more ranges of CalRatio values;  
identifying the range in which said determined CalRatio value falls;  
employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range; and  
generating further measurement values indicative of amount or concentration of analyte present in the biological system, said generating comprising obtaining a raw signal specifically related to analyte amount or concentration in the biological system and using said algorithm to correlate the raw signal with a measurement value.

49. (New) A monitoring system for measuring an amount or concentration of analyte present in a biological system, said system comprising, in operative combination:  
a sensing device in operative contact with the analyte, wherein said sensing device obtains a raw signal from the analyte and said raw signal is specifically related to the

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amount or concentration of analyte; and

one or more microprocessors in operative communication with the sensing device, wherein said one or more microprocessors comprises programming to control

(i) operation of the sensing device; and

(ii) determining a calibration ratio (CalRatio) value, wherein

$$\text{CalRatio} = \frac{BG_{cp}}{(\text{active}_{cp} + \text{offset})}$$

wherein  $BG_{cp}$  is a blood glucose concentration at the calibration point,  $\text{active}_{cp}$  is an active signal that corresponds to an electrochemical sensor signal at the calibration point, and  $\text{offset}$  was a constant value;

providing two or more ranges of CalRatio values;

identifying the range in which said determined CalRatio value falls;

employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range; and

generating further measurement values indicative of amount or concentration of analyte present in the biological system, said generating comprising obtaining a raw signal specifically related to analyte amount or concentration in the biological system and using said algorithm to correlate the raw signal with a measurement value.